AMSAT Weekly Satellite Report
Issue: WSR-089
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Hi OMs/YLs,

Here is Weekly Report of Satellites which are operational on
ANALOG & DIGITAL mode, received from AMSAT News Service (ANS).

To subscribe ANS, or for more list information, visit the following URL:
http://www.amsat.org/amsat/listserv/menu.html

73s,
VU2UGO

----- Original Message -----
From: <Mike73@...>
To: <ans@...>
Sent: Saturday, March 29, 2003 17:52
Subject: [ans] ANS-089 Weekly Satellite Report

This report is organized into 2 parts.
Part 1 - operational analog amateur satellites.
Part 2 - operational digital amateur satellites.

Would you like to help keep other satellite operators up to date
with the latest information? I'm looking for a new ANS-WSR editor.
If you're interested, please drop me a note: n1jez@...

SB SAT @ AMSAT $ANS-089.S1
WEEKLY SATELLITE REPORT PART 1

AMSAT NEWS SERVICE BULLETIN 089.S1 FROM AMSAT HQ
SILVER SPRING, MD, MARCH 30, 2003
TO ALL RADIO AMATEURS
BID: $ANS-089.S1

AO-40 AMSAT OSCAR 40
Launched: November 16, 2000 aboard an Ariane 5 launcher
from Kourou, French Guiana.
Status: Currently, the U/V/L-1/L-2 to S-2/K passband is active
at various times.
Uplink V-band 145.840 - 145.990 MHz CW/LSB
U-band 435.550 - 435.800 MHz CW/LSB
L1-band 1269.250 - 1269.500 MHz CW/LSB
L2-band 1268.325 - 1268.575 MHz CW/LSB
S1-band 2400.350 - 2400.600 MHz CW/LSB
Downlink: S-band 2401.225 - 2401.475 MHz CW/USB
K-band 24,048.010 - 24,048.060 MHz CW/USB

AO-40 experimental transponder operation started on May 05, 2001 at
approximately 08:00 UTC when the U-band and L1-band uplinks were
connected to the S-2 transmitter passband downlink via the Matrix
switch.

The nominal ALON/ALAT is now 30/0.
The passband has been moved to MA 120 - 240.

Gene, W3PM has an Excel spreadsheet that will help evaluate your
AO-40 groundstation. Download it at:
http://www.amsat.org/amsat/ftp/software/spreadsheet/w3pm-ao40-v2.1.zip

Scott, NX7U has a program that automatically calculates Uplink S/N
against a supplied Nova for Windows orbital listing. Download it at:
http://members.cox.net/nx7u/ao40/ao40v20_AutoSNR.zip

The "AO-40 FAQ", compiled by Steve, VK5ASF is now available at:
http://www.amsat.org

Ground stations capturing telemetry from AO-40 are asked to send a
copy of the data to the AO-40 archive at: ao40-archive@....

For the current transponder-operating schedule visit:
http://www.amsat-dl.org/journal/adlj-p3d.htm

[ANS thanks AMSAT-NA and AMSAT-DL for this information]
=====
ARISS - INTERNATIONAL SPACE STATION
Worldwide packet uplink: 145.990 MHz FM
Region 1 voice uplink: 145.200 MHz FM
Region 2/3 voice uplink: 144.490 MHz FM
Worldwide downlink: 145.800 MHz FM
TNC callsign: RS0ISS-1

The ARISS initial station was launched September 2000 aboard shuttle
Atlantis. ARISS is made up of delegates from several major national
Amateur Radio organizations, including AMSAT.
Status: Operational.

The current Expedition 6 crew is:
Commander Ken Bowersox, KD5JBP
Flight Engineer Nikolai Budarin, RV3FB
NASA ISS Science Officer Don Pettit, KD5MDT

The Packet system is currently non-operational.

Alain, IZ6BYY and Claudio, IK1SLD wish to announce the opening
of the ISS Fan Club. Visit: http://www.issfanclub.com

The ISS Fan Club announces the introduction of the "ISS
Achievement Award". Visit: http://www.issfanclub.com/iaa

Information on how to access the Amateur Radio equipment aboard
the ISS is available at:
http://www.marex-na.org/fileshtml/unprotopage.html

The ISS daily crew schedule can be found at:
http://spaceflight.nasa.gov/station/timelines/
When crew members have free time, they may be available for
Amateur Radio operations.

U.S. callsign: NA1SS
Russian callsigns: RS0ISS, RZ3DZR

The QSL routes for W/VE stations working the International
Space Station (all callsigns):

U.S. stations (a SASE is required to get a QSL in return):
Margie Bourgoin, KB1DCO
Attn: ARISS Expedition-1 (or 2, 3, etc.) QSL
ARRL, 225 Main Street
Newington, Connecticut 06111

Canadian stations:
Radio Amateurs of Canada

Attn: ARISS Expedition-1 (or 2, 3, etc.) QSL
720 Belfast Road, Suite 217
Ottawa, Ontario KEG 0Z5

European stations (a SASE and 2 IRC's are required to get
a QSL in return).
AMSAT-France
14 bis, rue des Gourlis
92500 Rueil Malmaison
France

More information is available at: http://ariss.gsfc.nasa.gov/

[ANS thanks Will Marchant, KC6ROL, and Jean-Louis Rault, F6AGR,
for this information]
=====
AO-7 AMSAT OSCAR 7
Uplink: 145.850 to 145.950 MHz CW/USB Mode A
432.125 to 432.175 MHz CW/LSB Mode B
Downlink: 29.400 to 29.500 MHz CW/USB Mode A
145.975 to 145.925 MHz CW/USB Mode B
Beacon: 29.502 MHz, 145.972 MHz, 435.1 MHz, 2304.1 MHz
Launched: November 15, 1974 by a Delta 2310 from Vandenberg Air Force Base,
Lompoc, California. Status: Semi-operational in sunlight.

After being declared dead 21 years ago in mid 1981 due to battery failure,
AO-7 has miraculously sprung back to life and was first detected by
Pat Gowen, G3IOR on June 21, 2002 at 1728 UTC. Jan King, W3GEY reports
AO-7 is running off the solar panels only. It will only be on when in
sunlight and off in eclipse. Therefore, AO-7 will reset each orbit and
may not turn on each time.

On July 11, 2002 AO-7 was successfully commanded for the first time since
it was declared dead 21 years ago. Commands were sent and accepted to
change the CW beacon code speed.

Command investigation continues. So far, 11 different commands have been
accepted by AO-7.

Yoshi Imaishi, JF6BCC is compiling an excellent list of observations.
Please send him whatever you have. jf6bcc@...
You can view the list at:
http://plaza16.mbn.or.jp/~palau/temp/AO7-mode-report.xls

Tim, K3TZ has written a program to decode AO-07 telemetry.
The program can be downloaded at:
http://www.qsl.net/k3tz/files/K3TZ_AO-07_Telemetry_Decoder_0.5.zip

For more AO-7 info: http://www.amsat.org/amsat/sats/n7hpr/ao7.html

[ANS thanks Pat Gowen, G3IOR and Jan King, W3GEY for this information]
=====
AO-10 OSCAR 10
Uplink: 435.030 to 435.180 MHz CW/LSB
Downlink: 145.975 to 145.825 MHz CW/USB
Beacon: 145.810 MHz (unmodulated carrier)
Launched: June 16, 1983 by an Ariane launcher from Kourou,
French Guiana. Status: Semi-operational.

AO-10 has been locked into a Mode-B, 70-cm uplink and
2-meter downlink for several years.

W4SM has more information about the satellite at the following URL:
http://www.cstone.net/~w4sm/AO-10.html

[ANS thanks Stacey Mills, W4SM, for his AO-10 status information
and web site]
=====
UO-14
Uplink: 145.975 MHz FM
Downlink: 435.070 MHz FM
Launched: January 22, 1990 by an Ariane launcher from Kourou,
French Guiana. Status: Operational, mode J.

Tim, KG8OC, features UO-14 information on the Michigan AMSAT
web site:
http://www.qsl.net/kg8oc

Ray, W2RS, has revised the AO-27 FAQ on < www.amsat.org > to
include information on UO-14.

[ANS thanks Chris Jackson, G7UPN/ZL2TPO, for UO-14 information]
=====
RS-15 RADIO SPORT RS-15
Uplink: 145.858 to 145.898 MHz CW/USB
Downlink: 29.354 to 29.394 MHz CW/USB
Beacon: 29.352 MHz (intermittent)
SSB meeting frequency: 29.380 MHz (unofficial)
Launched: December 26, 1994 from the Baikonur Cosmodrome
Status: Semi-operational, mode-A, using a 2-meter uplink and a
10-meter downlink.

Dave, WB6LLO, has operating information for both RS-15 on his
web site. In addition to satellite data, antenna information for
mode-A operation is also featured. The WB6LLO web site URL is:
http://home.san.rr.com/doguimont/uploads

[ANS thanks Dave Guimont, WB6LLO, for this information]
=====
FO-20 JAS-1b
Uplink: 145.90 to 146.00 MHz CW/LSB
Downlink: 435.80 to 435.90 MHz CW/USB
Beacon: 435.795
Launched: February 07, 1990 by an H1 launcher from the Tanegashima
Space Center in Japan.
Status: Operational. FO-20 is in mode JA continuously.

Tak, JA2PKI, reported FO-20 control station operators believe that the
UVC (Under Voltage Controller) is now regulating the transponder. The
controller monitors battery voltage and tries to protect the batteries
from over discharge.

[ANS thanks Kazu Sakamoto, JJ1WTK, for the FO-20 status reports]
=====
RS-20
Beacon: 145.828, 435.319 MHz
Launched: November 28, 2002 aboard a Kosmos 3-M rocket from Plesetsk.
Status: Telemetry heard on the 70 cm beacon.

RS-20 is an experimental payload aboard the Russian satellite known as
Mozhayets -- a navigational and scientific satellite. RS-20 transmits
CW telemetry. Each frame begins and ends with the call sign RS-20.

Table for decoding telemetry is as follows:
Name   Limits   Decoding   Assignment

RS 20   The callsign
UBS   N=100:170   U=N / 10 Volts   On board voltage

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IBS    N=10:250    I=N / 100 Ampers  On board current
USUN   N=0:180     U=N / 10 Volts    Charge voltage from solar battery
ISUN   N=0:180     I=N / 100 Ampers  Charge current from solar battery
ITXA   N=0:170     I=N / 100 Ampers  D.C. current of the 435 MHz Tx
PTXA   N=0:70      P=N / 10 Watts    UHF power of the 435 MHz Tx
TTXA   N=50:190    T=N - 100 deg C   Temperature of the 435 MHz Tx
ITXB   N=0:150     I=N / 100 Ampers  D.C. current of the 145MHz Tx
PTXB   N=0:70      P=N / 10 Watts    VHF power of the 145MHz Tx
TTXB   N=50:190    T=N - 100 deg C   Temperature of the 145MHz Tx
TEXT   N=30:250    T=N - 100 deg C   Temperature of the outer case
TINT   N=30:190    T=N - 100 deg C   Temperature of the inner case
TOR    N=10:250    T=N - 100 deg C   Temperature of the Earth sensor
UOR    N=0:100     U=N / 10 Volts    Temperature of the Sun sensor
MTX    N=0:255     Table of operational modes. The housekeeping info.
MRX    N=0:255     Table of operational modes. The housekeeping info.
RS 20                                The callsign

Please send reception reports to:
plis@... or zaitzev@...

[ANS thanks Alexander N. Zaitzev, RW3DZ for this information]
=====
AO-27 AMRAD
Uplink:     145.850 MHz FM
Downlink:   436.795 MHz FM
Launched: September 26, 1993 by an Ariane launcher from Kourou,
French Guiana. Status: Semi-operational, mode J.

AO-27's orbit has moved the satellite into a period of Full Orbit Solar
Illumination. Due to this, the TEPR method of timing the Transmitter does
not work. Therefore AO-27 cannot turn its transmitter on by itself and can
only be turned on by ground station command.

March 15th, 2003 UTC
New software has been uploaded successfully to AO-27. The new commands are
working great and ON-ORBIT checkout is continuing. During the upcoming week
control operators will be checking out the new scheduler and fine tuning the
scheduler parameters. We will be turning on the Analogue Repeater for time
to
time during this checkout period when we don't need to collect telmetry. If
all continues to go well, we will be able to turn AO-27 back to Normal
self scheduled operations in a few weeks.

Thanks goes out to N1UC and W4XP for their tremendous effort in getting this
new software up to the bird.

The latest information on AO-27 from control operator Michael
Wyrick, N3UC (former N4USI), can be found at:
http://www.ao27.org

An AO-27 question-and-answer page is available on the AMSAT-NA web
site, with updates by Ray, W2RS. The URL is:
http://www.amsat.org/amsat/intro/ao27faq.html

[ANS thanks AMRAD for AO-27 information]
=====
FO-29 JAS-2
Launched: August 17, 1996, by an H-2 launcher from the Tanegashima
Space Center in Japan. Status: Operational.

Voice/CW Mode JA
Uplink:     145.90 to 146.00 MHz CW/LSB
Downlink:   435.80 to 435.90 MHz CW/USB
Beacon:     435.795 MHz
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Digital Mode JD
Uplink:     145.850 145.870 145.910 MHz FM
Downlink:   435.910 MHz 1200-baud BPSK or 9600-baud FSK
Callsign:   8J1JCS
Digitalker: 435.910 MHz

Mineo, JE9PEL, has an FO-29 satellite telemetry analysis program that
will automatically analyze all digital telemetry from the satellite
(such as current, voltage and temperature). FO29CWTE is available at:
http://www.ne.jp/asahi/hamradio/je9pel/

[ANS thanks Kazu Sakamoto, JJ1WTK, for the FO-29 status reports]
=====
SO-41  SAUDISAT-1A
Uplink:         145.850 MHz
Downlink:       436.775 MHz
Broadcast Callsign: SASAT1-11
BBS:            SASAT1-12
Launched: September 26, 2000 aboard a converted Soviet ballistic
missile from the Baikonur Cosmodrome.
Status: Operational but intermittent.

The spacecraft is operating in Mode-J, currently configured as an
analog FM voice repeater, as power and spacecraft experiments permit.

Further information is available at:
http://www.amsat.org/amsat/sats/n7hpr/so41.html

[ANS thanks Turki Al-Saud for this information]
=====
SO-50 SAUDISAT-1C
Uplink:         145.850 MHz (67.0 Hz PL tone)
Downlink:       436.800 MHz
Launched: December 20, 2002 aboard a converted Soviet ballistic
missile from the Baikonur Cosmodrome. Status: Operational.

SO-50 carries several experiments, including a mode J FM amateur repeater
experiment operating on 145.850 MHz uplink and 436.800 MHz downlink.
The repeater is available to amateurs worldwide as power permits, using a
67.0
Hertz tone on the uplink, for on-demand activation.

[ANS thanks Turki Al-Saud for this information]

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SB SAT @ AMSAT $ANS-089.S2
WEEKLY SATELLITE REPORT PART 2

AMSAT NEWS SERVICE BULLETIN 089.S2 FROM AMSAT HQ
SILVER SPRING, MD, MARCH 30, 2003
TO ALL RADIO AMATEURS
BID: $ANS-089.S2

UO-11 OSCAR-11
Downlink:   145.826 MHz FM (1200-baud AFSK)
Mode-S Beacon:  2401.500 MHz
Launched: March 1, 1984 by a Delta-Thor rocket from Vandenberg Air
Force Base in California. Status: Semi-operational.

OSCAR-11 has continued to operate in a default mode, controlled by
the watch-dog timer. The satellite transmits continuous ASCII
telemetry for about seven days on 145.826 MHz, followed by about 14
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days of silence. These times appear to be somewhat variable, and on
the last occasion the sequence was ten days off and nine days ON.
The mode-S beacon on 2401.5 MHz transmits continuously.

At the present time, ground control are unable to command the
satellite, due to low temperatures affecting the command decoder.
They will attempt to command the satellite when the command decoder
temperature has risen to 15C.

The mode-S beacon has been heard by Michael OH2AUE. He uses a home
brew feed horn antenna with a three stage pre-amp.

A Windows program for displaying and capturing OSCAR-11 data is now
available. This is MIXW2, a general purpose Amateur Radio data
communication program written by Nick Fedoseev UT2UZ.
You can download the program from www.mixw.net
You need the latest version 2.07.

The following operating schedule is currently suspended.

ASCII status (210 seconds)
ASCII bulletin (60 seconds)
BINARY SEU (30 seconds)
ASCII TLM (90 seconds)
ASCII WOD (120 seconds)
ASCII bulletin (60 seconds)
BINARY ENG (30 seconds)

The ASCII bulletin is currently a static message, detailing modes and
frequencies of all active Amateur Radio satellites.

More information on OSCAR-11 is available at the following URL:
http://www.users.zetnet.co.uk/clivew/

[ANS thanks Clive Wallis, G3CWV, for OSCAR-11 status information]
=====
AO-16 PACSAT
Uplink: 145.90 145.92 145.94 145.96 MHz FM
(using 1200-baud Manchester FSK)
Downlink: 437.026 MHz SSB (1200-baud PSK)
Mode-S Beacon: 2401.1428 MHz
Broadcast Callsign: PACSAT-11
BBS: PACSAT-12
Launched: January 22, 1990 by an Ariane launcher from Kourou,
French Guiana. Status: Semi-operational, the digipeater command is on.

A WOD collection of current graphics along with general information
and telemetry samples can be found at:
www.telecable.es/personales/ea1bcu

[ANS thanks Miguel Menendez, EA1BCU, for AO-16 status information]
=====
UO-22 UOSAT
Uplink: 145.900 FM 9600-baud FSK
Downlink: 435.120 MHz FM
Broadcast Callsign: UOSAT5-11
BBS: UOSAT5-12
Launched: July 17, 1991 by an Ariane launcher from Kourou,
French Guiana. Status: Operational.

On November 21, 2002 Chris Jackson, G7UPN reported:

UO-22 is operating OK at the moment. Some new software has been loaded to
try and keep the downlink operating most of the time. It seems that after

around 60000 charge/discharge cycles the Nicad batteries are starting to
show their age!

The downlink will be switched off from time to time over certain parts
of the globe. This is required to allow the attitude control system to
operate correctly since the power system cannot supply enough power to
support both the transmitter and the magnetorquers.

More information on the satellite is available at the following URL:
http://www.sstl.co.uk/

[ANS thanks Chris Jackson, G7UPN/ZL2TPO, for UO-22 information
and Jim Weisenberger, AA7KC, for status information]
=====
IO-26 ITAMSAT
Uplink: 145.875 145.900 145.925 145.950 MHz
            FM (1200-baud)
Downlink: 435.812 MHz SSB
Broadcast Callsign: ITMSAT-11
BBS: ITMSAT-12
Launched: September 26, 1993 by an Ariane launcher from Kourou,
French Guiana. Status: Semi-operational, the digipeater function is on
and open for APRS users.

On November 18, 2002 Alberto, IK2BD reported:

The current configuration of IO-26 allows only limited telemetry in MBL
(safe)
mode. To enable full telemetry and digipeating, we must re-load the full IHT
high level software suite. This was delayed several times, but we plan to do
that in the near future. When the IHT code is running, the bulletin will
announce that.

[ANS thanks ITAMSAT Project Manager Alberto E. Zagni, I2KBD, for
IO-26 information]
=====
NO-44 PCSAT
Uplink/downlink: 145.827 MHz 1200 baud AX.25 AFSK via W3ADO-1
Aux/Uplink: 435.250 MHz 9600 baud via PCSAT-2 (off)
APRS Downlink: 144.390 MHz (Region 2)
Launched: September 30, 2001 aboard an Athena-1 rocket from the
Kodiak, Alaska launch complex. Status: Operational.

PCSat is a 1200-baud APRS digipeater designed for use by
stations using hand-held or mobile transceivers. Downlinks feed a
central web site < http://pcsat.aprs.org >. The APRS-equipped
PCSat was built by midshipmen from the U.S. Naval Academy
under the guidance of Bob Bruninga, WB4APR.

PCSAT BBS experiment ENDS

PCsat is in its eclipse season, so we must make sure that NO ONE
attempts to use the PBBS any more, as it drains the batteries,
and once we loose it, then we lose it for the next 2 months or more.
Please return to normal ops. This means:
NO CONNECTIONS TO or THROUGH PCSAT and no CONNECTIONS to PCSAT's BBS.
Please use UIDIGIPEATS only and for routine operations, avoid opertions
after dark and before sunrise..

A new version of PCSAT.EXE has been posted at:
ftp://tapr.org/dosstuff/APRSdos/pcsat017.zip

For more information, visit the PCSat web site at:
http://web.usna.navy.mil/~bruninga/pcsat.html

[ANS thanks Bob Bruninga, WB4APR, for PCSat information]
=====
MO-46 TIUNGSAT-1
Uplink: 145.850 or 145.925 MHz 9600-baud FSK
Downlink: 437.325 MHz
Broadcast callsign: MYSAT3-11
BBS: MYSAT3-12
Launched: September 26, 2000 aboard a converted Soviet ballistic missile from the Baikonur Cosmodrome. Status: Operational at 38k4-baud FSK.

TiungSat-1 is Malaysia's first micro-satellite and in addition to commercial land and weather imaging payloads offers FM and FSK Amateur Radio communication.

TiungSat-1, named after the mynah bird of Malaysia, was developed as a collaborative effort between the Malaysian government and Surrey Satellite Technology Ltd.

[ANS thanks Chris Jackson, G7UPN/ZL2TPO, for this information]
=====
AO-49 AATiS OSCAR-49 (SAFIR-M)
Uplink 435.275 1200-baud AFSK
Downlink 145.825 9600-baud FSK
(optional voice message)
Broadcast callsign: DP0AIS
Launched: December 20, 2002 aboard a converted Soviet ballistic missile from the Baikonur Cosmodrome. Status: Operational.

AO-49 (SAFIR-M) is a German amateur radio payload onboard the small German scientific satellite "RUBIN-2".

AO-49 was built by the German amateur radio association "AATiS e.V." (German acronym for "Arbeitskreis Amateurfunk und Telekommunikation in der Schule", which means: 'working group for amateur radio and telecommunications in schools').
AO-49 is designed as a "store and broadcast" system for APRS based messages, dedicated for the use of schools in combination with the existing WX-Net and planned buoy experiments in Germany.

No transmissions detected since the 1st of February 2003!
It appears AO-49 is not properly aligned to illuminate the solar panels. This should end soon. Due to its orbit, AO-49 will be in a phase without eclipses until 13Feb03.

Martin DG8UAU has written a small software program "SAFIR-M Decoder" to allow decoding of the received DATA0 frames. It is available at: http://amend.gmxhome.de in the section Aktuelles.

Details on AO-49 (SAFIR-M) can be found at:
http://amend.gmxhome.de
Information about AATiS e.V. is available at:
http://www.aatis.de

[ANS thanks Oliver Amend, DG6BCE for this information]

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ANS is released worldwide via the AMSAT ANS e-mail reflector and a live radiocast on the AMSAT-NA 20-meter net held each Sunday on 14.282 MHz. Pre-net operations start at 18:00 UTC, with current ANS bulletins transmitted to the eastern U.S. at 19:00 UTC and to the western U.S. at 19:30 UTC.

Information on AMSAT-NA is available at the following URL:
http://www.amsat.org

AMSAT-NA
850 Sligo Avenue, Suite 600
Silver Spring, Maryland 20910-4703

Voice: 301-589-6062
888-322-6728
FAX: 301-608-3410

Currently, AMSAT-NA supports the following (free) mailing lists:

* AMSAT News Service (ANS)
* General satellite discussion (AMSAT-BB)
* Orbit data (KEPS)
* Manned space missions (SAREX)
* District of Columbia area (AMSAT-DC)
* New England area (AMSAT-NE)
* AMSAT Educational Liaison mailing list (AMSAT-EDU)
* AMSAT K-12 Educational Liaison mailing list (AMSAT-K12)

A daily digest version is available for each list.

To subscribe, or for more list information, visit the following URL:
http://www.amsat.org/amsat/listserv/menu.html

In addition to regular membership, AMSAT-NA offers membership in the President's Club. Members of the President's Club, as sustaining donors to AMSAT Project Funds, will be eligible to receive additional benefits. Application forms are available from the AMSAT-NA Office.

AMSAT-NA has developed an on-line volunteer survey, designed to identify the interests and skills of those who may be available to directly help in efforts to develop the amateur satellite program. The survey is designed to be completed and returned on-line, and takes only a few minutes to fill out. To request the survey, simply send an e-mail request to:
volunteer@...

ANS would like to thank Mike Seguin, N1JEZ, ANS principal satellite investigator and Jerry Brown, K5OE for helping provide current satellite information.

ANS is always dedicated to past ANS editor 'BJ' Arts, WT0N, and to the memory of longtime AMSAT supporters Werner Haas, DJ5KQ, Dennis Kitchen, G0FCL and John Branegan GM4IHJ.

Please send any amateur satellite news or reports to:
ans-editor@...

/EX

Via the ans mailing list at AMSAT.ORG courtesy of AMSAT-NA.
To unsubscribe, send "unsubscribe ans" to Majordomo@...